

Notice of Allowability

Application No.

09/614,784

Examiner

Jason M. Perilla

Applicant(s)

KANDALA ET AL.

Art Unit

2638

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the amendment filed June 30 2005.
2. ☒ The allowed claim(s) is/are claims 26-29 renumbered respectively as claims 1-4.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date 20050901.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

EXAMINER'S AMENDMENT

1. Claims 26-28 are pending in the instant application.
2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Kurt Rohlf (54,405) on August 31, 2005.

The application has been amended as follows wherein the following versions of claims 26 and 27 replace all prior versions in their entirety, and claim 29 is new:

26. A method of demodulating a multi-level signal comprising:
- (a) identifying at least one signal constellation vector proximate to said multilevel signal;
 - ~~(b)~~ ~~comparing respective measures of reliability of at least two bits of said constellation vector of said demodulated multilevel signal, said respective measures of reliability being log likelihood ratios and being limited to a predetermined range;~~
 - ~~(b) (e)~~ assigning a respective hard decision bit values to at least one bit associated with a greater reliability individual bits of said multilevel signal occupying corresponding bit positions of said at least one proximate constellation vector having constant value; and
 - ~~(c) (d)~~ assigning respective reliability measures to a soft decision value to at least one bit associated with a lesser reliability individual bits of said multilevel signal occupying corresponding bit positions of said at least one proximate constellation vector having varying value; and
 - ~~(d)~~ comparing respective reliability measures of said multilevel signal to a predetermined range, said respective reliability measures being log likelihood ratios; where bits having reliability measures outside the predetermined range

are assigned hard decision bit values and bits having reliability measures within the predetermined range are assigned soft decision bit values and the predetermined range is chosen according to a desired mix of hard decision and soft decision bit assignments for bits occupying corresponding bit positions of said at least one proximate constellation vector having varying value.

27. The method of claim 26 where each of said respective log likelihood ratios is limited to a range of values according to less than the possible number of bits that could be assigned ~~soft values~~ reliability measures.

29(new). The method of claim 26 where said desired mix is selected to achieve an optimum mix of bits produced by soft and hard decisions.

Claims 26-29 are renumbered respectively as claims 1-4, and the claim dependency is renumbered accordingly.

Allowable Subject Matter

3. Claims 26-29 renumbered respectively as claims 1-4 are allowed.

4. The following is an examiner's statement of reasons for allowance:

Claims 26-29 renumbered respectively as claims 1-4 are allowed because the prior art of record does not disclose or obviate the particular steps claimed in the instant invention. That is, specifically, the prior art reference Harada et al (US 6115435 – previously cited) discloses making hard decisions for bits of a received multilevel signal that have a constant value and soft decisions for bits having a varying value against a constellation vector, but does not disclose applying a predetermined range as a threshold against reliability measures of bits that have a varying value to determine which of such bits are to be further determined according to hard decisions and soft decisions.

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Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason M. Perilla whose telephone number is (571) 272-3055. The examiner can normally be reached on M-F 8-5 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Vanderpuye can be reached on (571) 272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Jason M. Perilla
September 1, 2005

jmp


CHIEH M. FAN
PRIMARY EXAMINER